

Tropical Bryology 4: 17-22, 1991

Epiphyllous Hepaticae of Kowloon Peninsula (Hong Kong)

Paul Pui-Hay But¹ and Cai-Hua Gao²

¹Department of Biology, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong

²Shanghai Museum of Natural History, Shanghai, People's Republic of China

Abstract. Twenty-eight species of epiphyllous liverworts were identified from twenty-five sites in Kowloon Peninsula, Hong Kong. Twenty-four of these species are new records to Hong Kong, while four of them are new epiphyllous records to the Chinese mainland. The majority of the sites are located between 30-200 m above sea level, representing the lowest altitude of epiphyllous liverworts found in the Chinese mainland. Characteristics of the host plants bearing epiphyllous liverworts are briefly discussed. The following new combination is proposed: *Cololejeunea pseudolatilobula* (Chen & Wu) But & Gao *comb. nov.* (*Pedinolejeunea pseudolatilobula* Chen & Wu).

Epiphyllous liverworts have attracted much interest in China (Chen & Wu 1964; Lin et al. 1982; Wu & Lin 1978; Wu & Lou 1978; Wu et al. 1983; Liu 1985; Wu & Guo 1986; Wu et al. 1987a,b; Gao & But 1988; Li & Wu 1988; Liu et al. 1988; Wu & Lin 1988). Recently, Luo (1990) made a synopsis of Chinese epiphyllous liverworts based on published records, and concluded that (1) a total of 102 species of epiphyllous liverworts are known in China and that (2) epiphyllous liverworts are found south of the Yangtzi River at altitudes between 200-2800 meters.

Since our first discovery of epiphyllous liverworts on Tai Mo Shan (Daiwu Shan) in Kowloon Peninsula (Gao & But 1988), we have undertaken a more vigorous search for epiphyllous liverworts

throughout the Peninsula. Results of our survey would add new information to epiphyllous liverworts in China and are reported here.

Kowloon Peninsula is a southern extension of the Chinese mainland at the mouth of the Pearl River delta and is connected along the north border to Shenzhen, P.R.C. The Peninsula, together with Hong Kong Island, Lantau Island and some 230 smaller islands, constitute the British colony, Hong Kong. Currently, the Peninsula is divided into two administrative regions: Kowloon and the New Territories (Figure 1). Lying between 22° 15'N-22° 34'N and 113° 53'E-114° 20'E, Kowloon Peninsula enjoys a subtropical climate. Mountains of various heights of up to 980 m cover most parts of the Peninsula, except Kowloon, the northwestern lowlands and the coastlines.

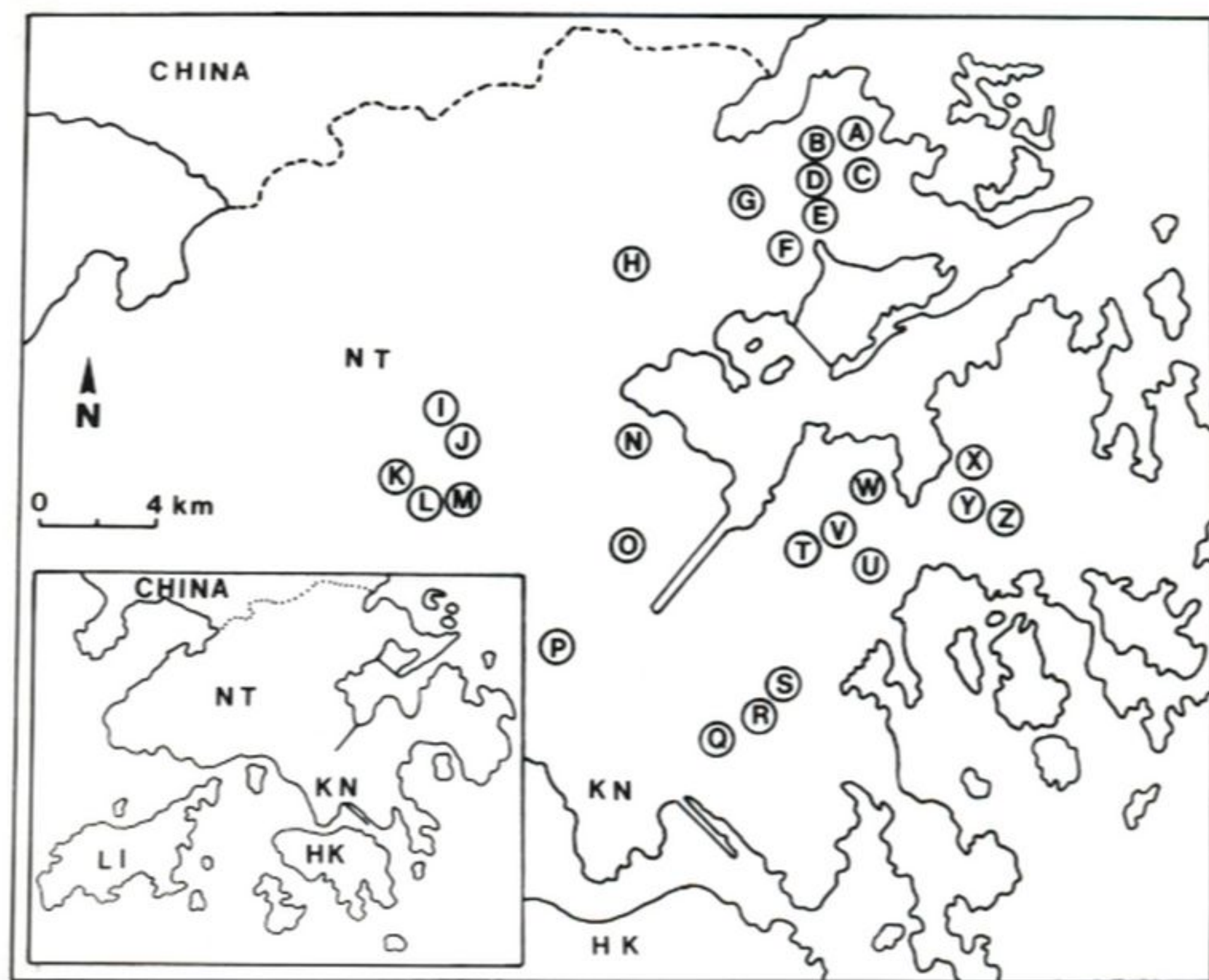


Figure 1. Map of Kowloon Peninsula (Hong Kong) showing the sites where epiphyllous liverworts were found. HK = Hong Kong Island; KL = Kowloon; LI = Lantau Island; NT = New Territories. Names of the sites are listed in Table 1.

Table 1. Sites with epiphyllous liverworts in Kowloon Peninsula

Site	Location	Altitude	Species
A	Lai Chi Wo	50 m	5,6,7,10,13,15,18
B	Lai Chi Wo	100 m	5,7,13,18
C	Mui Tsz Lam	150 m	5,6,7,10,11
D	A Ma Wat	240 m	1,7,27
E	Wu Kau Tang	140 m	7,8,9,10,13,14,18
F	Wang Shan Keuk	250 m	3,4,19
G	Ha Tsat Muk Kiu	230 m	3,16,18,22,27
H	Hok Tau Reservoir	140 m	12
I	Ng Tung Chai	100 m	5,7
J	Ng Tung Chai	300 m	18
K	Tsing Tam Lower Irrigation Reservoir	140 m	12,24,25,26,28
L	Tai Mo Shan	730 m	6,17,21,27
M	Tai Mo Shan	650 m	(Gao & But 1988)
N	Tai Po Kau	150 m	5,7,8,10,18,28
O	Wong Chuk Yeung, Shatin	220 m	10
P	Golden Hill, Kam Shan	240 m	7,8
Q	Kowloon Peak	110 m	17,23,25
R	Tai Lam Wu	130 m	5,8,10,11,13,15,16,28
S	Wang Che	120 m	8,16,27
T	Mau Ping, Ma On Shan	200 m	7,12,13,18,20
U	Kak Hang Tun, Sai Kung	120 m	2,7,8,12,18
V	Hang Cho Shui, Sai Kung	120 m	8
W	Kei Ling Ha	60 m	3,7,8
X	Yung Shue O	30 m	8,12,13,15,18
Y	Shek Hang, Tai Mong Tsai	90 m	11,17,18
Z	Ping Tun, Tai Mong Tsai	120 m	7,8,17

Warm and wet southeasterly winds from the ocean predominate, except in the winter months when chilling winds sweep from the north. Rain falls mainly on the eastern windward slopes, leaving the northwestern plain comparatively drier.

Our search in Kowloon Peninsula has led to the discovery of epiphyllous liverworts on the adaxial leaf surface of vascular plants in 25 new sites (sites A-L and N-Z). A complete list of these sites is presented in Table 1 and their locations in Figure 1. All these sites are found in the New Territories mainly on the windward slopes of the mountains. A majority of these sites (18 out of 25) are located below 200 m above sea level. Sites X (Yung Shu O), A (Lai Chi Wo) and W (Kei Ling Ha) are located even as low as 30-60 m above sea level. The general habitat of the 25 sites is subtropical evergreen broadleaf woodlands with small streamlets running below or along the banks of little brooks of 1-5 m wide. Site K (Tsing Tam Lower Irrigation Reservoir) is slightly different; there the epiphyllous liverworts were found on plants under shade growing on or along a cement wall above a tunnel for water catchment. These sites are rather small, mostly of only one to several square meters; but the sites E (Wu Kau Tang), N (Tai Po Kau), R (Tai Lam Wu) and Z (Ping Tun) are rather large, up to 30x3 square meters. The majority of the epiphyllous liverworts were found on leaves less than 1 m above ground; but some samples were collected between 1.5-2 m above ground in the larger sites.

Over 300 specimens were collected and deposited in the herbaria of the Biology Department, The Chinese University of Hong Kong and of Shanghai Museum of Natural History. A total of 28 species were identified; 24 of them are new records to Hong Kong, whereas four of them are new epiphyllous records to the Chinese mainland.

The 28 epiphyllous liverworts are listed below. Those new to Hong Kong are marked with an asterisk, whereas those new to the Chinese mainland with a cross. Representative specimens are chosen for each site of collection, and the sites are indicated by capital letters in parentheses following the specimen citations.

Cephaloziaceae

1. +**Cephalozia macounii* (Aust.) Spruce
But & Gao 88048 on *Pothos chinensis* (D).

Frullaniaceae

2. **Frullania muscicola* Steph.

But & Gao 89180 on *Pandanus forceps* (U)

3. **Frullania tamarisci* (L.) Dum.

But 88028 on *Pothos chinensis* (F); But & Gao 89072 on *Pothos chinensis* (G); But & Gao 89078 on *Psychotria serpens* (W).

Lejeuneaceae

4. **Cheilolejeunea imbricata* (Nees) Hatt. But 88029 on *Maesa japonica* (F)

5. **Cololejeunea amoena* Benedix

But & Gao 88177 on *Pronephrium simplex* (A); But & Gao 88211 on *Cibotium barometz* (B); But 89014 on *Psychotria rubra* (C); But 88140 on *Maesa perlarius* (I); But & Gao 89102 on *Psychotria rubra* (N); But & Gao 89144 on *Ardisia quinquegona* (R).

6. **Cololejeunea floccosa* (Lehm. & Lindenb.) Schiffn.

But & Gao 88172 on *Pandanus forceps* (A); But 89016 on *Schefflera octophylla* (C); But & Wai 88004 on *Pothos chinensis* (L.).

7. *Cololejeunea goebelii* (Gott. ex Schiffn.) Schiffn.

But & Gao 88175 on *Pronephrium simplex* (A); But & Gao 88210 on *Cibotium barometz* (B); But 89004 on *Adiantum flabellatum* (C); But 88045 on *Osmunda vachellii* (D); But & Gao 88120 on *Alpinia chinensis* (E); But & Wai 88002 on *Rourea millettii* (I); But & Gao 88159 on *Caesalpinia crista* (N); But & Gao 89080 on *Pandanus forceps* (P); But & Wai 90087 on *Pronephrium simplex* (T); But & Gao 89171 on *Psychotria rubra* (U); But & Gao 89077 on *Pandanus forceps* (W); But & Gao 89167 on *Blechnum orientale* (Z).

8. **Cololejeunea himalayensis* (Pande & Misra) Schust.

But 88021 on *Mallotus hookerianus* (E); But & Gao 89127 on *Millettia nitida* (N); But & Gao 89081 on *Pandanus forceps* (P); But & Gao 90028 on *Pteris semipinnata* (R); But & Gao 90001 on *Pronephrium simplex* (S); But & Gao 89178 on *Blechnum orientale* (U); But & Gao 89191 on *Uvaria microcarpa* (V); But & Gao 89079 on *Psychotria serpens* (W); But 88056 on

Syzygium jambos (X); But & Gao 89164 on *Pandanus forceps* (Z).

9. *Cololejeunea lanciloba Steph.

Gao & Wai 27283 on *Mallotus hookerianus* (E).

10. *Cololejeunea ocellata (Horik.) Benedix
But & Gao 88170 on *Pronophrium simplex* (A);
But 89007 on *Sarcandra glabra* (C); But 88020
on *Abarema clypearia* (E); But & Gao 89128 on
Psychotria rubra (N); But & Gao 89151 on
Pronophrium simplex (O); But & Gao 89145 on
Blechnum orientale (R).

11. *Cololejeunea pseudocrystallina Chen &
Wu But & Gao 90059 on *Pellionia scabra* (C);
But & Gao 90025 on *Pothos chinensis* (R); But &
Gao 89153 on *Pronophrium simplex* (Y).

12. *Cololejeunea pseudolatilobula (Chen &
Wu) But & Gao, *comb. nov.* [*Pedinolejeunea*
pseudolatilobula Chen & Wu, *Acta Phytotax.*
Sinica 9:270, 1964]

But & Gao 90038 on *Osmunda vachelii* (H); But
& Gao 89192 on *Pothos chinensis* (K); But &
Woo 90090 on *Pothos chinensis* (T); But & Gao
89194 on *Sarcandra glabra* (U); But & Gao
90046 on *Mallotus hookerianus* (X).

13. *Cololejeunea reineckeana Steph. [*C. for-*
mosana Mizt.]

But & Gao 88180 on *Uvariamicrocarpa* (A); But
& Gao 88197 *Pronophrium megacuspis* (B); Gao
& Wai 27280 on *Mallotus hookerianus* (E); But
& Gao 89142 on *Ardisia quinquegona* (R); But
& Wai 90088 on *Pronophrium simplex* (T); But
89036 on *Adina pilulifera* (X).

14. +*Cololejeunea schmidtii Steph. [*C. nippon-*
nica (Horik.) Hatt.]

Gao & Wai 27281 on *Mallotus hookerianus* (E).
15. *Cololejeunea spinosa (Horik.) Pande & Misra
But & Gao 88171 on *Pronophrium simplex* (A);
But & Gao 89143 on *Pronophrium simplex* (R);
But 89033 on *Mussaenda pubescens* (X).

16. *Lejeunea catanduana (Steph.) Mill.

But & Gao 89075 on *Psychotria serpens* (G); But
& Gao 90014 on *Pothos chinensis* (R); But & Gao
90003 on *Pothos chinensis* (S).

17. *Lejeunea flava (Sw.) Nees

But & Wai 88014 on *Pothos chinensis* (L); But &
Gao 89076 on *Psychotria serpens* (Q); But & Gao
89154 on *Pronophrium simplex* (Y); But & Gao
89166 on *Osmunda vachelii* (Z).

18. *Leptolejeunea elliptica (Lehm. & Lindenb.)
Schiffn.

But & Gao 88173 on *Pronophrium simplex* (A);
But & Gao 88217 on *Blechnum orientale* (B); But
88022 on *Castanopsis fissa* (E); But & Gao 89073
on *Psychotria serpens* (G); But 88144 on *Bauhinia*
championi (J); But & Gao 88147 on *Millettia*
nitida (N); But & Woo 90084 on *Osmunda*
angustifolia (T); But & Gao 89177 on *Psychotria*
rubra (U); But 89031 on *Pronophrium simplex*
(X); But & Gao 89152 on *Pronophrium simplex*
(Y).

19. *Lopholejeunea applanata (Reinw., Bl. &
Nees) Steph.

But 88030 on *Bowringia callicarpa* (F).

20. *Lopholejeunea subfusca (Nees) Schiffn.

But & Wai 90086 on *Sarcandra glabra* (T).

21. Microlejeunea punctiformis (Tayl.) Steph.

But & Wai 88004 on *Pothos chinensis* (L.).

22. +*Rhaphidolejeunea spicata (Steph.) Grolle
But & Gao 89074 on *Psychotria serpens* (G).

Lepidoziaceae

23. *Bazzania tricrenata (Wahl.) Trev.

But & Gao 89075 on *Psychotria serpens* (Q).

24. *Bazzania tridens (Reinw., Bl. & Nees) Trev.

But & Gao 89099 on *Psychotria serpens* (K).

Lophocoleaceae

25. Heteroscyphus argutus (Reinw., Bl. & Nees)
Schiffn.

But & Gao 89193 on *Pothos chinensis* (K); But &
Gao 89075 on *Psychotria serpens* (Q).

26. *Heteroscyphus planus (Mitt.) Schiffn.

But & Gao 89194 on *Pothos chinensis* (K).

Metzgeriaceae

27. *Metzgeria conjugata Lindb.

But & Gao 88048 on *Pothos chinensis* (D); But &
Gao 89073 on *Psychotria serpens* (G); But & Wai
88014 on *Phothos chinensis* (L); But & Gao
90002 on *Pothos chinensis* (S).

Plagiochilaceae

28. +*Plagiochila fruticosa Mitt.

But & Gao 89195 on *Pothos chinensis* (K); But &
Gao 89119 on *Ardisia quinquegona* (N); But &
Gao 89139 on *Pothos chinensis* (R).

Conclusion

Based on our specimens as well as published records on Chinese epiphyllous liverworts, we may draw four more observations not mentioned by Luo (1990):

- 1) Distribution of epiphyllous liverworts in Hong Kong can be at altitudes as low as 30-60 m, which represents the lowest altitude of epiphyllous liverworts found in the Chinese mainland.
- 2) Epiphyllous liverworts are found on leaves of ferns, fern allies (*Lycopodium*, *Huperzia* and *Selaginella*) and angiosperms (dicotyledons and monocotyledons); no record on gymnosperm leaves is reported.
- 3) Plants bearing epiphyllous liverworts are perennials, and may be woody, herbaceous or lianous.
- 4) Leaf surfaces bearing epiphyllous liverworts are often smooth, but may be hairy and somewhat rugged, such as those of *Pellionia scabra*, *Melastoma sanguineum* and *Ardisia primulaefolia*.

Acknowledgements. Partial support was received from the UPGC small grant through The Chinese University of Hong Kong and from the Shanghai Museum of Natural History. Field and herbarium assistance from C.C. Wai and T.K. Woo and reference articles and specimens from S.Y. Hu, M.J. Lai, M. Mizutani and P.C. Wu are deeply appreciated.

Literature cited

- Chen, P.C. & P.C. Wu. 1964.** Study on epiphyllous liverworts of China (I). *Acta Phytotaxonomica Sinica* 9:213-276.
- Gao, C.H. & P.P.H. But. 1988.** Epiphyllous liverworts of Daiwu Shan, Jiulong (Kowloon). *Acta Botanica Yunnanica* 10:353-356.
- Li, D.K. & P.C. Wu. 1988.** A study of the epiphyllous liverworts of China (IV) The epiphyllous liverworts on Jinggang Shan, Jiangxi Province. *Investigatio et Studium Naturae* 8:38-42.
- Lin, P.J., Y.Y. Yang & Z.H. Li. 1982.** A study on the bryophytes of Ding Hu Shan. *Tropical and Subtropical Forest Ecosystem* 1:58-76.
- Liu, Z.L. 1985.** A preliminary study of hepaticae from Mt. Jiulongshan, Prov. Zhejiang, Eastern China. *Investigatio et Studium Naturae* 5:133-152.

Liu, Z.L., X.H. Guo & R.L. Hu. 1988. Investigation on the epiphyllous liverworts from southern parts of Anhui Province, East China. *Journal of East China Normal University (Natural Science)* No.4:89-96.

Luo, J.S. 1990. A synopsis of Chinese epiphyllous liverworts. *Tropical Bryology* 2:161-166.

Wu, P.C. & X.H. Guo. 1986. A report on the epiphyllous liverworts in Anhui Province, China. *Acta Phytotaxonomica Sinica* 24:136-138.

Wu, P.C., D.K. Li & C.H. Gao. 1983. Studies on the epiphyllous liverworts of China (III), the epiphyllous liverworts on Wuyi Mt., Fujian Province. *Wuyi Science Journal* 3:1-6.

Wu, P.C., D.K. Li & C.H. Gao. 1987a. Preliminary measurement on some ecological factors of the epiphyllous liverworts in Mt. Wuyi. *Acta Botanica Sinica* 29:449-452.

Wu, P.C., D.K. Li & C.H. Gao. 1987b. Light and epiphyllous liverworts in the subtropical evergreen forests of south-east China. *Symposia Biologica Hungarica* 35:27-32.

Wu, P.C. & P.J. Lin. 1978. A preliminary observation on the Hepaticae of Hainan Island, China and their phytogeographical relationships. *Acta Phytotaxonomica Sinica* 16:56-71.

Wu, P.C. & Q.W. Lin. 1988. The epiphyllous liverworts in Maolan, Libo County, SW China. *Guihaia* 8:335-338.

Wu, P.C. & J.S. Lou. 1978. Studies on the epiphyllous liverworts of China (II) The epiphyllous liverworts from Tibet. *Acta Phytotaxonomica Sinica* 16:102-112.